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Music Listening Preferences in Early Life

Infants' Responses to Accompanied Versus Unaccompanied Singing

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This study investigated infant listening preferences for two versions of an unfamiliar Chinese children's song: unaccompanied (i.e., voice only) and accompanied (i.e., voice and instrumental accompaniment). Three groups of 5-, 8- and 11-month-old infants were tested using the Headturn Preference Procedure. A general linear model analysis of variance was carried out with gender and age as the between-subjects variables and listening time to the two renditions (unaccompanied, accompanied) as the within-subjects variable. Results indicated a clear preference for the unaccompanied version of the song in all age groups.

Keywords: *infants; music perception and cognition; a cappella and accompanied singing; musical texture; early childhood music education*

In the past few decades, studies in music psychology, music education, and developmental speech perception have revealed some startling auditory-perceptual abilities of young infants (e.g., Hannon & Trehub, 2005; Trainor, Wu, & Tsang, 2004). From birth, infants are already equipped with some remarkable abilities to perceive, distinguish, and remember a wide variety of both musical and linguistic sounds (e.g., Ilari & Polka, 2006; Saffran, Loman, & Robertson, 2000; Trainor et al., 2004; Werker & Tees, 1999). These abilities are extremely important because they help infants learn everyday life behaviors and contingencies that are common to their routines. It also is through perception, discrimination, and memorization that infants learn to communicate with caregivers and others through speech and musical sounds found in their cultures.

The data for this project were collected at the Infant Speech Perception Laboratory, McGill University. The authors would like to thank the parents and children who participated in this study. They also would like to thank Eva Villalba for her help with data collection and Dr. Linda Polka for comments on a previous version of this article. Address correspondence to Beatriz Ilari, Department of Music Education, Federal University of Paraná–DeArtes, Rua Coronel Dulcídio 638 Batel, 80420-160 Curitiba PR Brazil; e-mail: beatrizilari@yahoo.ca.

Compelling evidence exists to suggest that infants are sophisticated music listeners (for a recent review, see Trehub, 2006). From a rather early age, they are said to be sensitive to some of the most important musical properties including pitch and melodic contour (Trainor & Heinmiller, 1998; Zentner & Kagan, 1998), timbre (Ilari & Polka, 2006), and rhythm (Hannon & Johnson, 2005; Hannon & Trehub, 2005). In addition, infants are already capable of developing mental representations of musical information and storing them in long-term memory during the 1st year of life (Ilari & Polka, 2006; Saffran et al., 2000; Trainor et al., 2004; Volkova, Trehub, & Schellenberg, 2006).

Infants also exhibit some clear auditory preferences in the beginning of life. In the developmental psychology and infant music perception literature, the term *preference* is not related to common parlance, that is, to "choosing one thing over another" or "liking one thing more than another." Rather, preference is measured as an index of attention (for a discussion, see Kemler-Nelson et al., 1995). In other words, when infants "prefer" one particular type of musical or speech sound, it means that they listen significantly longer to one stimulus type in a comparison of two or more stimuli. Thus, measures of infant preference in the laboratory provide information about the relative salience of types of stimuli.

Infants show some clear preferences for sounds early in life. Shortly after birth, they recognize and prefer to listen to the maternal voice over another woman's voice (see DeCasper & Fifer, 1980; Standley & Madsen, 1990). In fact, infants are very attracted to the human voice and can form mental representations of a familiar voice after hearing only a few repetitions of it (Jusczyk, Hohne, Jusczyk, & Redanz, 1993). As they develop, infants quickly learn to orient their behaviors and modulate their arousal states by picking up the emotional content found in the melodic contours of maternal/caregiver speech and song (Fernald, 1989; Rock, Trainor, & Addison, 1999; Shenfield, Trehub, & Nakata, 2003; Trainor, 1996; Trainor, Austin, & Desjardins, 2000). Voices are, therefore, quite appealing to young babies.

Nevertheless, infant auditory preferences are not limited to voices. Young infants also have some clear preferences for music. Previous studies suggest that they prefer consonant over dissonant music (Zentner & Kagan, 1998), single over multiple timbres in music pieces (Ilari & Polka, 2006), high- over low-pitched singing (Trainor & Zacharias, 1998), and directed over nondirected versions of songs (Trainor, 1996). It is noteworthy that many studies on infant music preferences have been based on singing. Such choice of repertoire can be justified when one considers both the importance and the ubiquity of singing in the early years (Custodero, 2006; Custodero, Britto, & Brooks-Gunn, 2003; Ilari, 2005; L'Etoile, 2006; Trehub & Schellenberg, 1995; Trehub et al., 1997).

Infants' music environments, however, are seldom limited to a solo vocal repertoire. As Young (2007) suggests, in everyday life, they also are exposed to a wide variety of music that is presented by different media (e.g., TV, radio, Web sites) and in different places (e.g., car, shops). A portion of this repertoire includes accompanied versions of songs that make use of different textures. In Western music, four main

terms have been used to circumscribe the complexities that surround the concept of musical texture: monophony (e.g., a single melody), homophony (e.g., a chordal texture), heterophony (e.g., a type of accompaniment using several versions of the same melody), and polyphony (e.g., more than one independent melody heard simultaneously). According to Dunsby (1989), these terms are not categorically distinct and represent, to some extent, the historical evolution of Western music.

Despite its historical and compositional importance, few studies have focused specifically on the cognition of musical texture. Most of these studies have investigated adult perception of polyphonic music (Ellis, 1995; Fujioka, Trainor, Ross, Kagiji, & Pantev, 2004; Gregory, 1990), children's discrimination of simultaneous melodies (Gudmundsdottir, 1999; Serafine, 1984), preferences for or responses to accompaniment styles and timbres (Brittin, 2000; Sims & Cassidy, 1997), and the effects of texture on music learning (Beckett, 1997; Guilbault, 2004; Williams, 2005). Studies dealing specifically with infant perception of musical texture were not retrieved in the literature.

The purpose of this study was, therefore, to examine infant preferences for a piece of vocal music in two versions: one part (i.e., voice only) and more than one part (i.e., voice and instrumental accompaniment, with a heterophonic texture). A thorough investigation of infant perception and preferences for unaccompanied and accompanied music pieces is important for many reasons. First, it is highly relevant for early childhood music education. By understanding infant preferences for different musical textures, practitioners may prepare their lessons and orient parents and caregivers more adequately. Second, given that musical texture involves single and (sometimes) multiple sounds played at the same time, such studies also may shed light on infant perception of simultaneous events (see Bregman, 1990; Gudmundsdottir, 1999; Sloboda, 1983).

Method

Participants

To recruit participants, invitation letters were sent out to parents of babies residing in Montréal, Canada. Sixty-seven families volunteered to participate in the study and signed consent forms during their scheduled lab visits. Parents were reimbursed for travel and parking expenses, and each infant received an "Infant Scientist Degree" as a token of appreciation.

As per parental report, all infants were healthy and born at term; they also were free of ear infections and colds on the day of testing. Six additional infants did not complete testing due to equipment failure ($n = 4$), fussing ($n = 1$), and parental interference ($n = 1$). Data from one 11-month-old Chinese boy were excluded from the final analysis due to parental familiarity with the Miao language.

Sixty infants composed the final sample. Previous studies have shown gender differences (Balaban, Anderson, & Wisniewski, 1998; Cassidy & Ditty, 2001; Cone-Wesson & Ramirez, 1997; Connellan, Baron-Cohen, Wheelwright, Batki, &

Ahluwalia, 2000; Curtis-Ponton, Eggermont, & Masuda, 1995; Eldredge & Salamy, 1996; Koelsch et al., 2003) as well as age-related changes (Lynch & Eilers, 1992; Standley & Madsen, 1990; see also Hunter & Ames, 1988) in infants' auditory preferences. For this reason, infants were grouped according to gender and age. Table 1 depicts how infants were grouped for this study.

Table 1
Distribution of Infant Age and Gender

Age Range (months:days)	# Boys	# Girls
4:17–6:15	10	10
7:04–8:21	10	10
10:00–12:10	7	13

Musical Stimuli

Given the importance and the ubiquity of the singing voice in the early years, this study made use of a vocal song. Two versions of a Chinese children's song, sung in the Miao language by a 9-year-old female child, were used for this study. The unaccompanied version was a vocal rendition of the pentatonic song "The Tea" (Corpataux, 1996, Track 1) collected in the Guizhou province of southwestern China. The song was in AAB form, with a clear tempo and beat. The accompanied version included the same child's vocal part found in the unaccompanied version and a specially composed heterophonic accompaniment that made use of diverse instruments, not always related to that culture (i.e., drums, strings, bagpipes) but completely based on the thematic material of the original song. The accompaniment also included nonpentatonic countermelodies presented by instruments in two short sections. The accompanied version of the song was renamed "The Moors of Miao" by the arrangers and recorded on the CD "Songs of Innocence" (Gubitsch & Courson, 1999, Track 9). Both versions of the song—accompanied and unaccompanied—had an identical vocal part and were matched for tempo and pitch.

These two versions of the same traditional song were chosen for three reasons. First, they were chosen because of their ecological validity (see Volkova et al., 2006). Both song versions consisted of "real" pieces of music that otherwise were disseminated in a rather small circle and therefore were unfamiliar to the participants. Second, they were sung by a female child in an unfamiliar language. Given that babies and young children prefer to listen to children's voices (Trehub, 2006) and tend to prefer high pitches (see Trainor & Zacharias, 1998), these song versions were deemed appropriate to maintain infants' interest. And third, because both versions of the song included an identical vocal part, they made the study of babies' responses to accompanied versus unaccompanied music possible.

To construct the stimuli, each version of the song was cut into 4 excerpts of 20 to 22 seconds in length (i.e., A, B, C, and D). These excerpts then were matched across versions so that each corresponding excerpt (e.g., A and A') started and ended at the exact same place with respect to the vocal part. During testing, infants heard 4 different excerpts of each song version (unaccompanied and accompanied). Each excerpt was played twice, yielding a total of 16 excerpts throughout the test series. The order of test trials was randomized across participants.

Procedure

The Headturn Preference Procedure (HPP) was used to assess infant preferences for unaccompanied and accompanied music (for a description of the HPP, see Kemler-Nelson et al., 1995). In this procedure, infant and parent were seated comfortably on a chair facing the center panel of a three-sided pegboard booth. A light was located at the center of each panel. Behind the light on the two side panels, a hidden loudspeaker was mounted. The experimenter was located behind the center panel and could view the infant through small holes in the pegboard. The parent and experimenter wore headphones over which masking music was played. This was done to prevent the experimenter and parent from influencing the child's responses.

At the beginning of a test trial, the experimenter flashed the center light to catch the infant's attention and have him or her face forward. Once the infant faced forward, one of the side lights flashed. Once the infant looked at the flashing light, the sound stimulus started. It continued to play until the infant looked away for more than 2 seconds, or until the end of the trial (20-22 sec). Once the sound stopped, a new trial began. If necessary, the experimenter used a puppet to attract the infant's attention to have him or her face forward.

Testing sessions for this study included 16 trials: 4 familiarization and 12 test trials. Familiarization trials were done to ensure that all infants learned the association between the flashing light and the presentation of the sound stimuli and could make head turns to both sides of the panel. Although the computer registered looking times for each of the 16 trials, only listening time data from the 12 test trials were included in the final analysis. To determine whether infants had a preference for unaccompanied or accompanied versions of the song, listening times to the 6 unaccompanied trials and the 6 accompanied trials were averaged separately and compared statistically.

Results

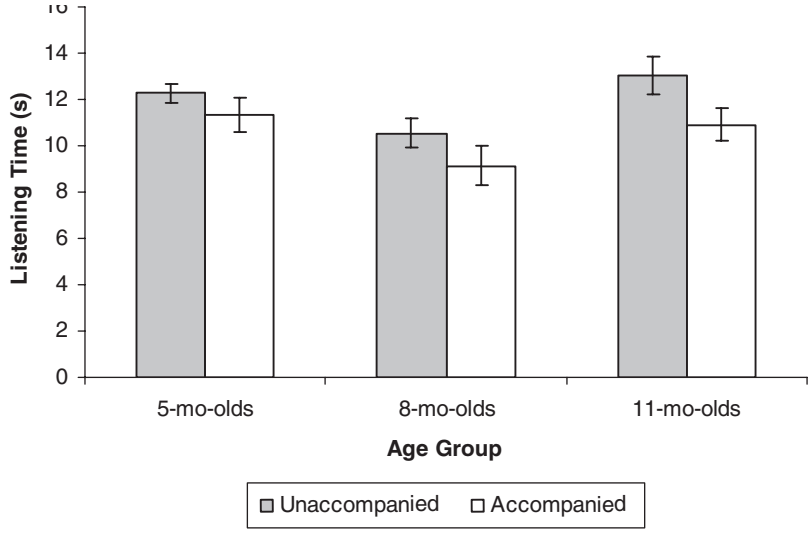
Mean listening times for the unaccompanied and accompanied versions of the song were calculated for each infant. Thirty-five babies listened longer to the unaccompanied rendition, 8 babies listened equally to the two versions (i.e., the difference was less than 0.7 seconds), and 17 babies listened longer to the accompanied version

of the song. Overall, infants listened much longer to the unaccompanied than to the accompanied versions of the song.

Figure 1 depicts infant preferences for the two versions of the song, across the three age groups. An analysis of variance (ANOVA) was used to determine whether infants preferred to listen to the unaccompanied compared with the accompanied version and, hence, discriminated between the two versions. A general linear model ANOVA was carried out with gender (male, female) and age (5, 8, and 11 months) as the between-subjects factors and listening time to the two music renditions (unaccompanied, accompanied) as the within-subjects factor.

In the ANOVA, only the main effects of age, $F(2, 54) = 3.94$, $p = .025$, $\eta^2 = 0.13$, and music type, $F(1, 54) = 9.9$, $p = .003$, $\eta^2 = 0.16$, were significant. There were no interactions between age, gender, or music type. Post hoc analyses indicated that, on average, 5-month-olds ($M = 11.8$; $SE = 0.47$) listened longer during the experiment when compared with the 8-month-olds ($M = 9.8$; $SE = 0.56$), $t(38) = 2.69$, $p = .01$; the 11-month-olds ($M = 11.97$; $SE = 0.67$) also listened longer during the experiment when compared with the 8-month-olds, $t(38) = 2.45$, $p = .019$. Of most importance for this study was the finding that infants at 5, 8, and 11 months listened significantly longer to the unaccompanied version compared with the accompanied version of the unfamiliar Chinese children's song.

Figure 1
Average Listening Times to Unaccompanied and Accompanied Renditions for 20 Infants in Each of the Three Age Groups



Discussion

This study was designed to determine whether infants would prefer to listen to one of two versions of a children's song in an unfamiliar language. We tested infants at 5, 8, and 11 months. Infants in all three age groups listened longer to the a cappella version of the song, which demonstrates an overall preference for the unaccompanied version over the accompanied version of the song.

There are several possible explanations for infants' heightened attention to the unaccompanied version. It can be argued that infants' preference for the unaccompanied song in this study arises from an innate bias for human voices (see DeCasper & Fifer, 1980) and the speech signal (Vouloumanos & Werker, 2004, 2007). In other words, it is possible that the human voice exerts a very powerful effect in catching infants' attention whether they are listening to speech or music. So, perhaps, babies prefer to listen to an unaccompanied song over an accompanied one for its human qualities. Also, consistent with earlier studies on the development of infant speech and music perception (Fernald, 1989; Nakata & Trehub, 2004; Trainor, 1996; Trainor et al., 2000), a high-pitched singing voice is probably powerful in early human communication and bonding in that it carries a voice alone (i.e., monophonic texture), which would be favored over other more complex textures (i.e., homophonic, heterophonic, or polyphonic).

It also is possible that within the first year of life, infants demonstrate a preference for simplicity in music due to some general cognitive limitations (see Schellenberg & Trehub, 1996, 1999; Trainor & Heinmiller, 1998; Zentner & Kagan, 1998). The unaccompanied version was simpler than the accompanied rendition on at least three dimensions. With respect to timbre, although the setting had a simple, clear, and traditional structure, the instrumentation consisted of several blocks of sounds played by different instruments. Thus, all parts included many variations of timbre and intensity. A previous study has suggested that infants prefer a piece of music presented in single timbre by a piano over the same piece presented in multiple timbres by an orchestra (Ilari & Polka, 2006). It is possible, then, that instead of the simultaneous musical timbres in the accompanied version, infants preferred the single timbre in unaccompanied singing.

It also is possible that infants preferred the unaccompanied singing due to its overall simpler musical structure. There is comparatively more simultaneous musical information (e.g., timbre, texture, harmony) in an accompanied song than in a one-voice song. Furthermore, the addition of an accompaniment to a melody has implications not only for the overall texture and timbre of the song but also for its form, rhythmic structure, and harmony. In other words, depending on its characteristics, an accompaniment may change completely the characteristics of a song, thereby affecting one's perception on many levels (see Gregory, 1990). Recall that the stimuli that we used in this study was made up of a single one-voice pentatonic song in a well-established and clear form (i.e., AAB), with clear tempo and beat, and

an accompanied version of the same song. The latter was quite complex and included world music instruments and, in some instances, unusual harmonic textures and rhythmic patterns. It is possible that such a complex version of the song included too much information at once and, thus, was just not appealing to the infants in our study.

Third, although there is research showing that adults may process lyrics and tunes independently (Bonnel, Faïta, Peretz, & Besson, 2001), it is possible that the same is not the case for infants. In the literature, there is some consensus that the discrimination of simultaneous auditory events can be rather difficult, especially for naïve listeners (see Bregman, 1990; Gudmundsdottir, 1999; Newman, 2005; Sloboda, 1983). In the specific case of music, it can be argued that young children find it difficult to focus on more than one aspect of a musical stimulus at once (see Gudmundsdottir, 1999; Sims, 1995). Through both experience and music education, children gradually develop the ability to perform tasks that involve focusing on one aspect of music while selecting and filtering out "irrelevant" information at the same time. They also learn to perceive simultaneous events (e.g., two- or three-part songs) and to treat them as independent parts of a whole (Serafine, 1984). According to some scholars (see Fernald, 1989; Papousek, 1996; Rock et al., 1999), in early human communication, the message that is carried out to infants is particularly implicit in the melody of speech or song. The unaccompanied version was perhaps more appealing because of its melodic salience (to read more about melodic contour, see Trehub, Bull, & Thorpe, 1984). In contrast, it is possible that infants find it difficult to retrieve the melody, arguably the part of the music that is most salient to them (Trehub, 2006), from heterophonic accompaniments.

Results from our study also suggest age-related differences in infant attention to music, with 5-month-olds and 11-month-olds attending significantly longer to music than 8-month-olds. Although previous developmental studies on music perception and cognition also have found age-related differences in infant responses (e.g., Lynch & Eilers, 1992), few studies have examined three or more groups of infants in the same experiment, as this one. An exception is a recent cross-sectional study conducted by Schmidt, Trainor, and Santesso (2003), who found differences in infant brain activity in response to affective music. In their study, whereas 3 month olds showed increased brain activity when listening to different musical stimuli, this effect was attenuated at 12 months postnatal age. Whether these age-related differences are mere artifacts of the specific groups of children tested or there is a more principled account for these differences is a question for further research.

It also was noteworthy that the overall listening times were quite high in this study. In fact, compared to other music studies that used the HPP procedure (e.g., Ilari & Polka, 2006), listening times here were much higher and infant dropout rates were much lower. There are some possible reasons why this might have happened. One of them may be due to the fact that the present study relied on previous works (Ilari & Polka,

2006; Trainor, 1996; Zentner & Kagan, 1998) to prepare its stimuli, which proved to be a good strategy. Even if we cannot pinpoint the exact musical feature or features that accounted for our results, it is clear that the combination of unaccompanied texture + high pitch + child vocal timbre + pentatonic melody + simple rhythmic structure was a successful one. It is not surprising that this combination of musical features has been at the heart of many early childhood music education practices and approaches.

To summarize, our study indicates that where recorded music is concerned, unaccompanied singing is more appealing to babies than accompanied singing. These results may not come as a surprise to many early childhood music education specialists who use voices as the main auditory sources for their lessons. Not only are these results in synchrony with the traditional repertoire of early childhood music found across the world (e.g., lullabies, play songs, nursery rhymes), which tends to be unaccompanied, but they also seem to converge with the practice of vocalizing and singing for young children (see Trehub & Schellenberg, 1995; Trevarthen & Aitken, 2001).

However, some caution is needed in drawing implications of our results for current practices in early childhood music education. Although babies listened longer to unaccompanied singing in a monophonic texture, these results should not be interpreted to mean that they are incapable of listening to or enjoying music that makes use of diverse textures and timbres. Rather, early childhood music educators need to be open when selecting music pieces for their lessons. The selection of repertoire should be directly linked with the types of activities in the classroom. For example, whereas infant–caregiver dyads may learn a new unaccompanied song that employs body gestures and facial expressions, they also may move to a polyphonic or heterophonic song or relax while listening to a choral or orchestral work. As Sims (2005) suggested, listening to recorded music of diverse styles "gives children the chance to encounter music beyond the level of their own performance ability and can provide them with a variety of positive musical experiences" (p. 78). These tasks also are important because they may provide infant–caregiver dyads with what Vygotsky (1934/1987) called the *zone of proximal development* (i.e., a task that a child can master only with the help of a more skilled person). In other words, although babies may have their preferences, it is important to present them with diverse music styles and textures, more so because younger children tend to be more open to diverse repertoires than older children (see Sims & Cassidy, 1997).

At the core of early childhood education is a kind of teaching continuum that moves from simple to complex. Educators generally plan their lessons to progress from the easier to the more challenging activities, matching them with children's engagement. This also is true for music. The repertoire of early childhood music classes generally includes simple one-part songs (e.g., lullabies, playsongs, nursery rhymes), and not whole symphonies, oratorios, or other genres, and tends to "grow with the child." It is possible that early childhood music education principles exploit infants and young children's natural propensity to engage with musical stimuli that somehow mirror their learning abilities.

In recent years, several scholars (see Dalla Bella, Peretz, Rousseau, & Gosselin, 2001; Guilbault, 2004) have questioned whether "simple" music is indeed more appropriate for babies and young children to hear (and learn). Our results attest to the salience of simple music for infants—they listened longer to simpler, unaccompanied renditions compared with the more complex, accompanied renditions. How children listen to and process accompanied music with diverse textures (i.e., heterophonic, homophonic, and polyphonic) deserves to be explored by further research.

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